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T-2377

Job No.: CTCE/BBMP/W.No.09/RM/CSR-10/159h/CEMENT/2016-17 Date: 03.10.2016

TEST REPORT ON CEMENT

* CUSTOMER	:	**Asst. Executive Engineer**, Vidyaranyapura Sub Division, BBMP, Bangalore.
*AGENCY	:	**Mr. R. Madhusudan,** Contractor, Bangalore.
*NAME OF THE WORK	:	Improvements to Roads at Sir M.V. Layout 5th Cross and other roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
*REFERENCE	:	BBMP/EE/BTP/WO/343/2015-16 Dated: 30.03.2016
SAMPLE ID	:	Cement
SAMPLE RECEIVED ON	:	01.10.2016
PERIOD OF TESTING	:	01.10.2016 to 03.10.2016

The results of the tests conducted on the cement sample are as follows:

Sl. No	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 8112-2013
1	Standard Consistency	IS-4031 (Part -4) 1988(RA-2009)	28.00 %	-
2	a) Initial Setting Time	IS-4031 (Part -5) 1988(RA-2009)	145 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part -5) 1988(RA-2009)	475 Minutes	Not More than 600 Minutes
3	Soundness by Le Chartlier Method	IS-4031 (Part-3) 1988(RA-2009)	1 mm	Not more than 10mm

*Information is furnished by the Customer/Representative.

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Job No.: CTCE/BBMP/W.No.09/RM/CSR-10/159h/SAND-Gradation/2016-17 : 03.10.2016

TEST REPORT ON DETERMINATION GRADATION OF FINE AGGREGATES

* Customer : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

* Agency : **Mr. R. Madhusudan,** Contractor, Bangalore.

* Name of Work : Improvements to Roads at Sir M.V. Layout 5th Cross and other roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : BBMP/EE/BTP/WO/343/2015-16 Dated: 30.03.2016

Technical Reference : IS : 2386 Part 1 - 1963 RA-2007

Sample ID : Fine Aggregates

Sample Received on : 01.10.2016

Date of Testing : 03.10.2016

Total Wt. of Aggregates in gms **1000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2007)			
		Zone-I	Zone-II	Zone-III	Zone-IV
10	100	100	100	100	100
4.75	96.40	90-100	90-100	90-100	95-100
2.36	77.20	60-95	75-100	85-100	95-100
1.18	55.20	30-70	55-90	75-100	90-100
600 Micron	27.00	15-34	35-59	60-79	80-100
300 Micron	12.00	5-20	8-30	12-40	15-50
150 Micron	4.00	0-10	0-10	0-10	0-15

* Information is furnished by the Customer/Representative

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Remarks : This sample is under Zone-I specific limits.

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Job No.: CTCE/BBMP/W.No.09/RM/CSR-10/159h/AGG/GR/2016-17 : 03.10.2016

TEST REPORT ON DETERMINATION GRADATION OF COARSE AGGREGATES

* Customer	: **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
* Agency	: **Mr. R. Madhusudan,** Contractor, Bangalore.
* Name of Work	: Improvements to Roads at Sir M.V. Layout 5th Cross and other roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	: BBMP/EE/BTP/WO/343/2015-16 Dated: 30.03.2016
Technical Reference	: IS : 2386 Part 1 -1963 RA-2007
Sample ID	: Coarse Aggregates (40mm)
Sample Received on	: 01.10.2016
Date of Testing	: 03.10.2016

Total Wt. of Aggregates in gms= **5000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2007)	
		Graded	Single Sized
80	100	100	-
63	100	-	100
40	97.60	95-100	85-100
20	36.60	30-70	0-20
10	16.60	10-35	0-5
4.75	3.60	0-5	-

* Information is furnished by the Customer/Representative

Remarks : This sample is under Graded specific limits.

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Job No.: CTCE/BBMP/W.No.09/RM /STEEL/2016-17 03.10.2016

TEST REPORT ON REINFORCEMENT STEEL

Customer	:	**Asst. Executive Engineer**, Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	:	**Mr. R. Madhusudan,** Contractor, Bangalore.
Name of the Work	:	Improvements to Roads at Sir M.V. Layout 5th Cross and other roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	:	BBMP/EE/BTP/WO/343/2015-16 Dated: 30.03.2016
Date of Test	:	03.10.2016
Technical Reference	:	IS: 1786-2008

Sl. No	Nominal size (dia) (mm)	Mass per metre (Kg/mtr)	TENSILE STRENGTH			Bend Test	Rebend Test
			0.20% proof stress/Yield stress N/mm^2	Tensile strength (Ultimate stress) N/mm^2	Elongation percent gauge length		
1	12	0.89	515	558	13.35	O.K	O.K

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Job No.: CTCE/BBMP/W.No.09/RM/WMM/Gradation/2016-17 : 26.10.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Mr. R. Madhusudan,** Contractor, Bangalore.

Name of Work : Improvements to Roads at Sir M.V. Layout 5th Cross and other roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : BBMP/EE/BTP/WO/343/2015-16 Dated: 30.03.2016

Date of Testing : 26.10.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **5000**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	120	120	2.4	97.6	95-100
22.4	1530	1650	33.0	67.0	60-80
11.2	990	2640	52.8	47.2	40-60
4.75	865	3505	70.1	29.9	25-40
2.36	625	4130	82.6	17.4	15-30
0.600	385	4515	90.3	9.7	8-22
0.075	300	4815	96.3	3.7	0-8

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Job No.: CTCE/BBMP/W.No.09/RM/WMM/AIV/2016-17 26.10.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. R. Madhusudan,** Contractor, Bangalore.
Name of the Work	Improvements to Roads at Sir M.V. Layout 5th Cross and other roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	BBMP/EE/BTP/WO/343/2015-16 Dated: 30.03.2016
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	26.10.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	389	390	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	88	89	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	301	
4	Aggregate Impact value = percent fines	22.62	22.82	
	$100^* (W_2/W_1)\%$			22.72

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.09/RM/WMM/S-T/2016-17 26.10.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. R. Madhusudan,** Contractor, Bangalore.
Name of Work	Improvements to Roads at Sir M.V. Layout 5th Cross and other roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	BBMP/EE/BTP/WO/343/2015-16 Dated: 30.03.2016
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	26.10.2016

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Result : Flakiness Index = **11.36%**

Elongation Index = **13.28%**

Result : Combined Flakiness & Elongation index **24.64%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.09/RM/CSR-10/159h/CUBE/2016-17 10.11.2016

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

* Customer : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

* Agency : **Mr. R. Madhusudan,** Contractor, Bangalore.

* Name of the work : Improvements to Roads at Sir M.V. Layout 5th Cross and other roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

* Reference : BBMP/EE/BTP/WO/343/2015-16 Dated: 30.03.2016

* Sample ID : Drain covering slab Concrete

Size of cubes : 150mmx150mmx150mm

Cross Sectional Area : 22500 mm^2

Technical Reference : IS: 516-1959 (Reaffirmed 2008)

* Grade of Concrete : M_{20}

Compressive Strength as on : 28th day

Sample Received on : 10.11.2016

Sl.No.	* Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	13.10.2016	10.11.2016	8.235	478.3	21.26
2	13.10.2016	10.11.2016	8.315	493.5	21.93
3	13.10.2016	10.11.2016	8.412	503.6	22.38

* Information is furnished by the Customer/Representative

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Job No.: CTCE/BBMP/W.No.09/RM/CSR-10/159h/CUBE/2016-17 04.11.2016

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

* Customer : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

* Agency : **Mr. R. Madhusudan,** Contractor, Bangalore.

* Name of the work : Improvements to Roads at Sir M.V. Layout 5th Cross and other roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

* Reference : BBMP/EE/BTP/WO/343/2015-16 Dated: 30.03.2016

* Sample ID : Cement Concrete

Size of cubes : 150mmx150mmx150mm

Cross Sectional Area : 22500 mm^2

Technical Reference : IS: 516-1959 (Reaffirmed 2008)

* Grade of Concrete : M_{15}

Compressive Strength as on : 28th day

Sample Received on : 04.11.2016

Sl.No.	* Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	07.10.2016	04.11.2016	8.103	365.9	16.26
2	07.10.2016	04.11.2016	8.239	379.6	16.87
3	07.10.2016	04.11.2016	8.380	389.3	17.30

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Job No.: CTCE/BBMP/W.No.09/RM/SDBC/AIV/2016-17

15.11.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	Asst. Executive Engineer, Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	Mr. R. Madhusudan, Contractor, Bangalore.
Name of the Work	Improvements to Roads at Sir M.V. Layout 5th Cross and other roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	BBMP/EE/BTP/WO/343/2015-16 Dated: 30.03.2016
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	15.11.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	389	392	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	88	89	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	303	
4	Aggregate Impact value = percent fines $100^* (W_2/W_1)\%$	22.62	22.70	22.66

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

Note:

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Job No.: CTCE/BBMP/W.No.09/RM/SDBC/Shape_T/2016-17 : 15.11.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	: **Mr. R. Madhusudan,** Contractor, Bangalore.
Name of Work	: Improvements to Roads at Sir M.V. Layout 5th Cross and other roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	: BBMP/EE/BTP/WO/343/2015-16 Dated: 30.03.2016
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 15.11.2016

Result : Flakiness Index = 12.32%

Elongation Index = 13.30%

Result : Combined Flakiness & Elongation index 25.62%

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.09/RM/SDBC/Stripping/2016-17 15.11.2016

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. R. Madhusudan,** Contractor, Bangalore.
Name of the work	Improvements to Roads at Sir M.V. Layout 5th Cross and other roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	BBMP/EE/BTP/WO/343/2015-16 Dated: 30.03.2016
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	15.11.2016

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.1	3.20	96.80
2	3.2		
3	3.3		

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.09/RM/SDBC/Sp_Wa/2016-17

15.11.2016

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. R. Madhusudan,** Contractor, Bangalore.
Name of the Work	Improvements to Roads at Sir M.V. Layout 5th Cross and other roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	BBMP/EE/BTP/WO/343/2015-16 Dated: 30.03.2016
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	15.11.2016

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2003	2005	2006	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_3$ g	1248	1250	1251	
4	Weight of saturated surface dry aggregate in air	W_3 g	2015	2016	2018	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	767	766	767	
6	Weight of oven dried aggregate	W_4 g	2002	2005	2004	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.610	2.617	2.613	2.613
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.655	2.656	2.661	2.657
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.65%	0.55%	0.70%	0.63%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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JAS-ANZ BSCIC ISO 9001 REGISTERED

Job No.: CTCE/BBMP/W.No.09/RM/SDBC/Bitumen/2016-17 15.11.2016

BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS2386 and IRC:SP:11-1984

CUSTOMER	Asst. Executive Engineer, Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	Mr. R. Madhusudan, Contractor, Bangalore.
NAME OF THE WORK	Improvements to Roads at Sir M.V. Layout 5th Cross and other roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	BBMP/EE/BTP/WO/343/2015-16 Dated: 30.03.2016
SAMPLE I/D	Roads in Sir.M.V. Layout Ward No.09
DATE OF TESTING	15.11.2016

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475.5	473.5
3. Weight of Asphalt and Mineral matter Extracted,	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	24.5	26.50
7. Bitumen content in %	4.90	5.30
8. Average	5.10	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	34.28	7.21	7.21	92.79	90-100
4.75	263.5	55.42	62.62	37.38	35-51
2.36	36.36	7.65	70.27	29.73	24-39
1.18	45.15	9.50	79.77	20.23	15-30
0.3	42.13	8.86	88.63	11.37	9-19
0.075	30.25	6.36	94.99	5.01	3-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	31.23	6.25	6.25	93.75	90-100
4.75	262.3	52.46	58.71	41.29	35-51
2.36	61.32	12.26	70.97	29.03	24-39
1.18	52.36	10.47	81.44	18.56	15-30
0.3	33.25	6.65	88.09	11.91	9-19
0.075	31.22	6.24	94.34	5.66	3-8

AEE (VR) SD

Note:

- This test report should not be reproduced except in full, without written approval of the laboratory.
- The results indicated above are based on the tests carried out on the samples received in the laboratory.
- Any Query regarding the report must be reported within 30 days from the date of testing.

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